

IN THE CLAIMS

1. (Original) A removable, water-whitening resistant pressure sensitive adhesive comprising a crosslinked aqueous emulsion polymer comprising:
 - (a) at least one hydrophobic monomer selected from an alkyl (meth)acrylate ester of an alcohol wherein the alkyl portion of the alcohol is linear or branched and contains at least 4 carbon atoms, or a mixture of at least one styrenic monomer and at least one alkyl (meth)acrylate ester of an alcohol wherein the alkyl portion of the alcohol is linear or branched and contains at least 4 carbon atoms, wherein when a styrenic monomer is present, said styrenic monomer is present in an amount up to about 30 wt. % of the total hydrophobic monomer mixture;
 - (b) greater than 1 wt. % of at least one hydrophilic monomer;
 - (c) greater than 3 wt. % of at least one mono-olefinically unsaturated monomer having an aldehyde or ketone group;
 - (d) optionally at least one partially hydrophilic monomer selected from alkyl (meth)acrylate esters of an alcohol wherein the alkyl portion of the alcohol has 1 to 2 carbon atoms, N-vinyl-2-pyrrolidone, or mixtures thereof; and
 - (e) an effective amount of at least one water-soluble or water-dispersible polymerizable surfactant selected from compounds having a terminal allyl amine moiety, substituted phenyl compounds having at least one alkenyl substituent, polyoxyalkylene-1-(allyloxymethyl) alkyl ether sulfate salts, or mixtures thereof;wherein said crosslinked aqueous emulsion polymer is crosslinked with at least one polyhydrazide crosslinker, the wt. % of monomers (a), (b), (c) and (d) are based on the total weight of monomers (a), (b), (c) and (d), and the mean particle size of said crosslinked aqueous emulsion polymer is less than about 400 nm.
2. (Original) The composition of claim 1 wherein the amount of monomer (a) in said crosslinked aqueous emulsion polymer is about 50 to about 95 wt. %.

3. (Original) The composition of claim 2 wherein the amount of monomer (a) in said crosslinked aqueous emulsion polymer is about 70 to about 90 wt. %.

4. (Original) The composition of claim 1 wherein the amount of monomer (b) in said crosslinked aqueous emulsion polymer is about 2 to about 10 wt. %.

5. (Original) The composition of claim 4 wherein the amount of monomer (b) in said crosslinked aqueous emulsion polymer is about 3 to about 8 wt. %.

6. (Original) The composition of claim 1 wherein the amount of monomer (c) in said crosslinked aqueous emulsion polymer is about 3.5 to about 20 wt. %.

7. (Original) The composition of claim 1 wherein the amount of monomer (d) in said crosslinked aqueous emulsion polymer is 0 to about 45 wt. %.

8. (Original) The composition of claim 7 wherein the amount of monomer (d) in said crosslinked aqueous emulsion polymer is about 5 to about 25 wt. %.

9. (Original) The composition of claim 1 wherein the pH of said aqueous emulsion polymer is at least 6.

10. (Original) The composition of claim 9 wherein the pH of said aqueous emulsion polymer is about 6.5 to about 9.

11-12. (Cancelled)

13. (Currently Amended) The composition of claim 1 wherein said removable, water-whitening resistant pressure sensitive adhesive has a peel strength of less than about 2.5 pounds per inch peel force with adhesive failure mode when said composition is applied to polypropylene.

14. (Original) The composition of claim 1 wherein said monomer (a) is selected from isooctyl acrylate, 4-methyl-2-pentyl acrylate, 2-methylbutyl acrylate, isoamyl acrylate, sec-butyl acrylate, n-butyl acrylate, 2-ethylhexyl acrylate, isodecyl methacrylate, isononyl acrylate, isodecyl acrylate, or mixtures thereof.

15. (Original) The composition of claim 14 wherein said monomer (a) is

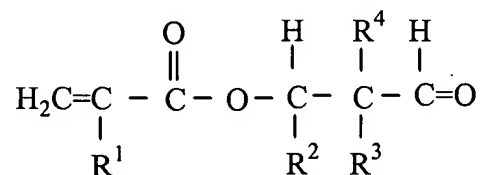
selected from n-butyl acrylate, 2-ethylhexyl acrylate, or mixtures thereof.

16. (Original) The composition of claim 1 wherein said monomer (b) is selected from a monoolefinic monocarboxylic acid, a monoolefinic dicarboxylic acid, 2-hydroxyethyl acrylate, or mixtures thereof.

17. (Original) The composition of claim 16 wherein said monomer (b) is selected from acrylic acid, methacrylic acid, fumaric acid, maleic acid, itaconic acid, crotonic acid, 2-hydroxyethyl acrylate, or mixtures thereof.

18. (Original) The composition of claim 17 wherein said monomer (b) is selected from acrylic acid, 2-hydroxyethyl acrylate, or mixtures thereof.

19. (Original) The composition of claim 1 wherein said monomer (c) is selected from acrolein, methacrolein, vinylbenzaldehyde, crotonaldehyde, (meth)acryloxyalkyl-propanals represented by the formula



where R¹ is -H or -CH₃, R² is -H or alkyl of 1 to 3 carbon atoms, R³ is alkyl of 1 to 3 carbon atoms, and R⁴ is alkyl of 1 to 4 carbon atoms, vinyl acetoacetate, allyl acetoacetate, vinyl methyl ketone, vinylbenzene methyl ketone, acetoacetoxyethyl methacrylate, vinyl ethyl ketone, vinyl isobutyl ketone, vinyl butyl ketone, diacetone (meth)acrylamide, diacetone (meth)acrylate, acetonyl acrylate, 2-hydroxypropyl acrylate-acetyl acetate, 1,4-butanediol acrylate-acetyl acetate, or mixtures thereof.

20. (Original) The composition of claim 19 wherein said monomer (c) is selected from diacetone acrylamide, diacetone acrylate, acrolein, or mixtures thereof.

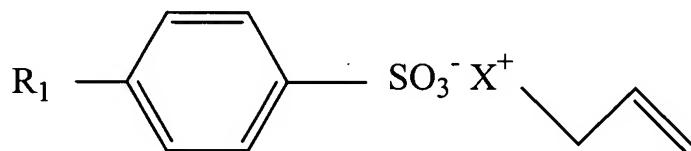
21-22. (Cancelled)

23. (Original) The composition of claim 1 wherein said polymerizable surfactant has a hydrophilic portion selected from a sulfonate allyl amine moiety, a

sulfate allyl amine moiety, or a phosphate allyl amine moiety, and a hydrophobic portion selected from -R, or a group having the formula $\text{RO}-(\text{CH}_2\text{CH}_2\text{O})_n-$; wherein R is an alkyl group or an alkyl-substituted phenyl group wherein the alkyl group has 1 to 20 carbon atoms, and n is an integer from 2 to 100.

24. (Cancelled)

25. (Original) The composition of claim 1 wherein said polymerizable surfactant is an allyl amine salt of an alkyl benzene sulfonate having the formula



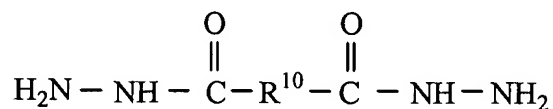
wherein R_1 is an alkyl group having 1 to 20 carbon atoms, and X^+ is selected from $^+\text{NH}_3$, $^+\text{NH}_2\text{R}_4$, or $^+\text{NHR}_4\text{R}_5$, wherein R_4 and R_5 are independently selected from C_1 - C_4 alkyl or hydroxyalkyl groups.

26. (Original) The composition of claim 25 wherein said polymerizable surfactant is an allyl amine salt of dodecylbenzene sulfonate.

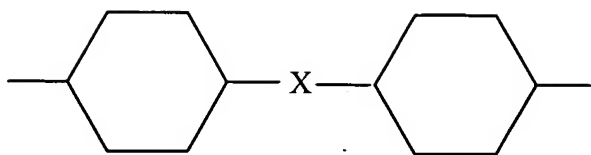
27-40. (Cancelled)

41. (Original) The composition of claim 1 wherein said polyhydrazide is selected from dihydrazides, trihydrazides, tetrahydrazides, bis-semicarbizides, aromatic polycarboxylic polyhydrazides, or mixtures thereof.

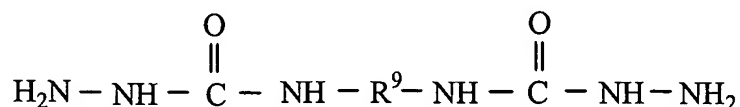
42. (Original) The composition of claim 41 wherein said polyhydrazide is selected from dihydrazides represented by the formula



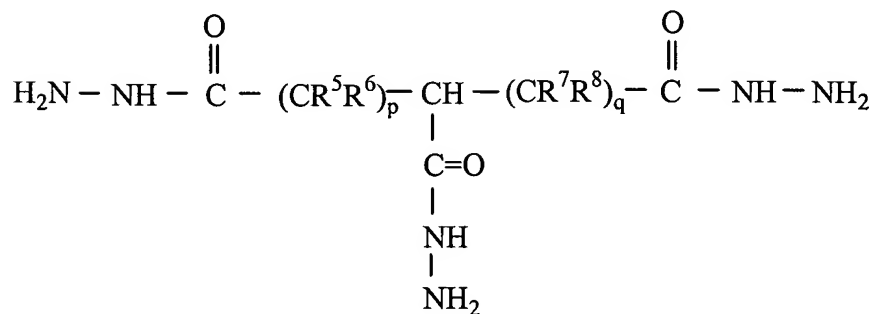
wherein R^{10} is selected from a linear or branched divalent alkylene group having 0 to about 10 carbon atoms, preferably 2 to 10 carbon atoms, a divalent alicyclic group having 4 to about 8 carbon atoms, a divalent aromatic ring, or



wherein the rings are alicyclic or aromatic and X is selected from -O-, -S-, -SO₂-, or -C(O)-; bis-semicarbizides represented by the formula



wherein R⁹ is a divalent straight-chain or branched alkylene group having 2 to about 7 carbon atoms or a divalent carbocyclic group having 6 to 8 carbon atoms; trihydrazides represented by the formula



wherein R⁵-R⁸ are independently selected from H or OH, p is an integer from 0 to 3, and q is an integer from 2 to 8, provided p + q ≤ 8 and p < q; or mixtures thereof.

43. (Original) The composition of claim 42 wherein said polyhydrazide is selected from oxalic acid dihydrazide, malonic acid dihydrazide, succinic acid dihydrazide, glutaric acid dihydrazide, adipic acid dihydrazide, sebacic acid dihydrazide, maleic acid dihydrazide, fumaric acid dihydrazide, itaconic acid dihydrazide, carbonic acid dihydrazide, phthalic acid dihydrazide, terephthalic acid dihydrazide, isophthalic acid dihydrazide, 1,2,4-butanetricarbohydrazide, 1,1,4-butanetricarbohydrazide, 1,2,5-pentanetricarbohydrazide, 1,3,6-hexane-tricarbohydrazide, 1,3,7-heptanetri-

carbohydrazide, 1-hydroxy-1,2,4-butanetricarbohydrazide, or mixtures thereof.

44. (Original) The composition of claim 41 wherein said polyhydrazide is an aliphatic dicarboxylic acid dihydrazide.

45. (Original) The composition of claim 44 wherein said polyhydrazide is adipic acid dihydrazide.

46-48. (Cancelled)

49. (Original) A removable, water-whitening resistant pressure sensitive adhesive comprising a crosslinked aqueous emulsion polymer comprising:

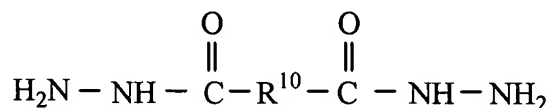
- (a) about 70 to about 90 wt. % of at least one hydrophobic monomer selected from an alkyl (meth)acrylate ester of an alcohol wherein the alkyl portion of the alcohol is linear or branched and contains at least 4 carbon atoms, or a mixture of at least one styrenic monomer and at least one alkyl (meth)acrylate ester of an alcohol wherein the alkyl portion of the alcohol is linear or branched and contains at least 4 carbon atoms, wherein when a styrenic monomer is present, said styrenic monomer is present in an amount up to about 30 wt. % of the total hydrophobic monomer mixture;
- (b) about 2 to about 10 wt. % of at least one hydrophilic monomer;
- (c) greater than 3 to about 20 wt. % of at least one mono-olefinically unsaturated monomer having an aldehyde or ketone group;
- (d) 0 to about 45 wt. % of at least one partially hydrophilic monomer selected from alkyl (meth)acrylate esters of an alcohol wherein the alkyl portion of the alcohol has 1 to 2 carbon atoms, N-vinyl-2-pyrrolidone, or mixtures thereof; and
- (e) about 0.1 to about 5 wt. % of at least one water-soluble or water-dispersible polymerizable surfactant selected from compounds having a terminal allyl amine moiety, substituted phenyl compounds having at least one alkenyl substituent, polyoxyalkylene-1-(allyloxymethyl) alkyl ether sulfate salts, or mixtures thereof;

wherein said crosslinked aqueous emulsion polymer is crosslinked with at least

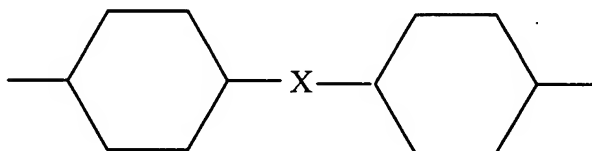
one polyhydrazide crosslinker, the wt. % of monomers (a), (b), (c) and (d) and the wt. % of polymerizable surfactant (e) are based on the total weight of monomers (a), (b), (c) and (d), and the mean particle size of said crosslinked aqueous emulsion polymer is less than about 400 nm.

50. (Original) The composition of claim 49 wherein said polyhydrazide is selected from dihydrazides, trihydrazides, tetrahydrazides, bis-semicarbizides, aromatic polycarboxylic polyhydrazides, or mixtures thereof.

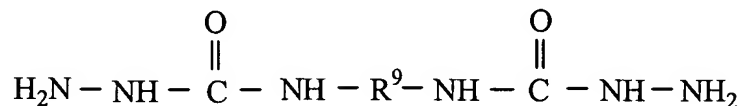
51. (Original) The composition of claim 50 wherein said polyhydrazide is selected from dihydrazides represented by the formula



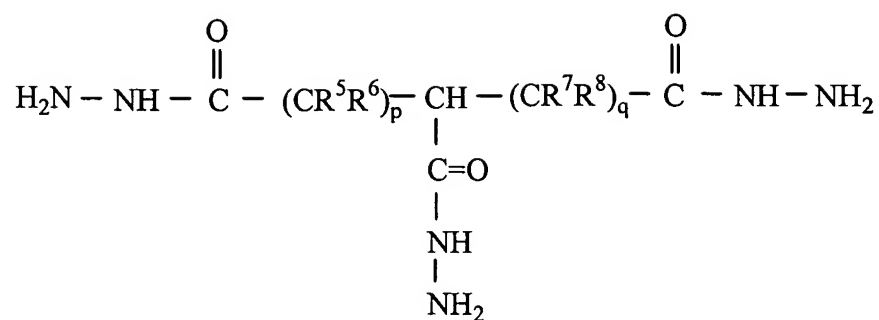
wherein R^{10} is selected from a linear or branched divalent alkylene group having 0 to about 10 carbon atoms, preferably 2 to 10 carbon atoms, a divalent alicyclic group having 4 to about 8 carbon atoms, a divalent aromatic ring, or



wherein the rings are alicyclic or aromatic and X is selected from -O-, -S-, -SO₂-, or -C(O)-; bis-semicarbizides represented by the formula



wherein R^9 is a divalent straight-chain or branched alkylene group having 2 to about 7 carbon atoms or a divalent carbocyclic group having 6 to 8 carbon atoms; trihydrazides represented by the formula



wherein R^5 - R^8 are independently selected from H or OH, p is an integer from 0 to 3, and q is an integer from 2 to 8, provided $p + q \leq 8$ and $p < q$; or mixtures thereof.

52. (Original) The composition of claim 51 wherein said polyhydrazide is selected from oxalic acid dihydrazide, malonic acid dihydrazide, succinic acid dihydrazide, glutaric acid dihydrazide, adipic acid dihydrazide, sebacic acid dihydrazide, maleic acid dihydrazide, fumaric acid dihydrazide, itaconic acid dihydrazide, carbonic acid dihydrazide, phthalic acid dihydrazide, terephthalic acid dihydrazide, isophthalic acid dihydrazide, 1,2,4-butanetricarbohydrazide, 1,1,4-butanetricarbohydrazide, 1,2,5-pentanetricarbohydrazide, 1,3,6-hexane-tricarbohydrazide, 1,3,7-heptanetricarbohydrazide, 1-hydroxy-1,2,4-butanetricarbohydrazide, or mixtures thereof.

53. (Original) The composition of claim 50 wherein said polyhydrazide is an aliphatic dicarboxylic acid dihydrazide.

54. (Original) The composition of claim 53 wherein said polyhydrazide is adipic acid dihydrazide.

55-63. (Cancelled)